

STANDBY PRODUCT PROFILE 2003/10

OCTOBER 2003

PRODUCT PROFILE



DISHWASHERS

AUSTRALIA'S STANDBY POWER STRATEGY 2002 - 2012

AN INITIATIVE OF THE MINISTERIAL
COUNCIL ON ENERGY FORMING
PART OF THE NATIONAL
GREENHOUSE STRATEGY

The National Appliance and Equipment Energy Efficiency Committee seeks comment on this proposal from any interested person or organisation.

Please email comments to:

energy.efficiency@greenhouse.gov.au

Alternatively, hard copy comments can be mailed to:

Dishwashers Product Profile
Equipment, Appliances & Transport Team
Built Environment & Communities Branch
Australian Greenhouse Office
GPO Box 621
CANBERRA ACT 2601

Comments received by 30 December 2003 will assist in determining the final form of the policy proposals taken to government regarding dishwashers.

An electronic version of this Standby Product Profile and other Profiles released for public discussion can be obtained from www.energyrating.gov.au under standby.

CONTENTS

Product Description - Dishwashers	3
Current Ownership and Trends	4
Relevant modes for the 1 Watt power plan	5
Known Standby Data for New Products	6
Known Standby Data for Installed Stock	6
Greenhouse Emissions	7
Current Overseas Policies and Trends	9
Government Target	11
Government Proposals to meet this Target	12
References	13



PRODUCT DESCRIPTION

Dishwashers are becoming increasingly popular in Australian households, particularly among families with children. They provide the user with a convenient way to get through the washing up without the manual effort of hand washing.

Dishwashers have a variety of features which vary from unit to unit, although generally, most dishwashers are capable of washing around 12 or 14 place settings in about one and a half hours.

CURRENT OWNERSHIP AND TRENDS

Dishwashers are present in around 35% of households in Australia and half of these households consisted of parents with children. Between 1994 and 2002 there has been a significant increase (10%) in the number of households with dishwashers in Australia, in particular in New South Wales (13%), Victoria (11%) and the Northern Territory (11%). Table 1 below shows the penetration of dishwashers in Australian households using both ABS and BIS Shrapnel sources. For 2002, BIS Shrapnel show a slightly higher penetration of 42% compared to 35% from ABS data, although the BIS Shrapnel survey is focused on new household appliance purchases between January 2001 and June

2002 whereas the ABS survey is purely of household appliance stock.

The vast majority of households have only one dishwasher with only 1% of houses reporting that they have two dishwashers in 2001/2002. Saturation in households is 1.02.

Retail sales of dishwashers are continuing to grow with around 170,400 units sold in 2001. For the period 1993 to 2001 sales increased at 5.4% per annum¹. Table 2 shows the sales of dishwashers over the period 1993 to 2001 and the average price as well as the total sales value.

TABLE 1: PENETRATION DATA FOR DISHWASHERS - AUSTRALIA

Year	Penetration	Source
June 1994	25.1%	ABS 4602.0
March 1999	30.1%	ABS 4602.0
March 2002	34.7%	ABS 4602.0
1997/98	37%	BIS Shrapnel
1999/2000	38%	BIS Shrapnel
2001/2002	42%	BIS Shrapnel

Sources: ABS 4602.0 Environmental Issues: People's views and practices March 2002
Bis Shrapnel The Household Appliances Market in Australia, 2002-2004

TABLE 2: AUSTRALIAN RETAIL SALES DISHWASHERS, 1993-2001

Year	Units Sold	Value (\$000)	Average Price (\$)
1993	111,506	\$103,361	\$927
1994	125,955	\$115,198	\$915
1995	127,308	\$114,652	\$901
1996	135,297	\$130,400	\$964
1997	149,149	\$147,372	\$988
1998	163,057	\$163,878	\$1,005
1999	170,840	\$172,697	\$1,011
2000	145,500	\$144,824	\$995
2001	170,374	\$173,140	\$1,016

Source: 1998-2000: GFK Marketing Services cited in Energy Efficient Strategies and EnergyConsult Greening Whitegoods – Appliance Efficiency Trends in Australia 1993-2001, February 2003

¹ Energy Efficient Strategies and EnergyConsult Greening Whitegoods – Appliance Efficiency Trends in Australia 1993-2001, February 2003

RELEVANT MODES FOR THE 'ONE WATT' POWER PLAN

Dishwashers sold in Australia have several operational modes:

- On (the unit is running a cycle or performing a program)
- Active standby (the unit is turned on and waiting to be programmed)
- Delay start (the unit has been turned to active standby and the program selected but commencement of program has been delayed by the user)
- End of program (program completed - waiting for action by the user)
- Off

The **on mode** is not generally relevant for the standby power plan, although the on mode power consumption and the hours of use are critical in determining total energy consumption of dishwashers. Dishwasher usage varies from state to state with households in the Northern Territory using their dishwashers more frequently than households in other states (47% use their dishwasher on a daily basis). Nationally, 37% use their dishwashers daily while 39% use them once a week.

Active standby mode is usually relevant only for a short period prior to commencement of the program. Power consumption in this mode is not relevant for the standby strategy as the dishwasher is usually only in this mode for short periods.

Delay start mode, the unit may be in this mode for several hours each day, but this feature is not present on all dishwashers and even where present is generally not used by all consumers. This mode is not considered relevant for the standby strategy at this stage.

End of program mode: this mode is present on many dishwashers available on the market in Australia today, most commonly those originating from Europe. This mode persists for an indefinite period at the completion of the program (i.e. the unit does not revert to off mode after a fixed period). In this mode, many units have an indicator light or visual display communicating that the dishwasher is either finished, or waiting to be programmed to start another dishwashing cycle. Given user habits, the end of program mode is likely to constitute a significant proportion of the total mode

time for a dishwasher, as dishwashers are often run overnight or complete their programs when the user is not there to turn it off. Standby limits for this mode are relevant to the standby strategy. As European model dishwashers constitute a third of the Australian market, end of program mode could be of concern in such models. As such, programs such as the "Blue Angel" labelling scheme in Germany (15% of models sold in Australia in 2001 were made in Germany) try to address this by stipulating that a product should not consume more than 5W in standby or 1W in "off".

Most dishwashers manufactured in Australia or New Zealand (constituting 55% of models sold in 2001²) "power down" at the end of a cycle, or turn themselves off. As such, end of program mode is not relevant for these models.

Off mode is applicable to all dishwashers and standby limits for this mode are relevant to the standby strategy. Very few dishwashers have a 'hard' off switch which disconnects the mains from most electrical circuits in an appliance. Most dishwashers have an electronic "off" switch that still connects the unit to a low voltage circuit.

There is limited data on how households turn off their dishwashers. However, a NAEEEEC commissioned survey of households conducted in 2000 did record details of how households left their dishwashers when not in use. The household survey measured the on, standby and off consumption of all appliances present in the household. Sixty-four houses were measured over three cities, Melbourne, Sydney and Brisbane. The survey found that where an observation could be made about the status of the dishwasher (i.e. the appliance was not "hard wired"), the majority of dishwashers (58%) were found to be plugged in and switched off. Fifteen percent were found unplugged, 4% were in standby and the remainder (23%) were on. It should be noted the dishwasher sample was very small (26, not including those that were hard wired) and as such we can only infer about the wider population in relation to how households leave their dishwashers when not in use.

² Sales figures quoted from data supplied by GfK Marketing Australia 2001.

KNOWN STANDBY DATA FOR NEW PRODUCTS

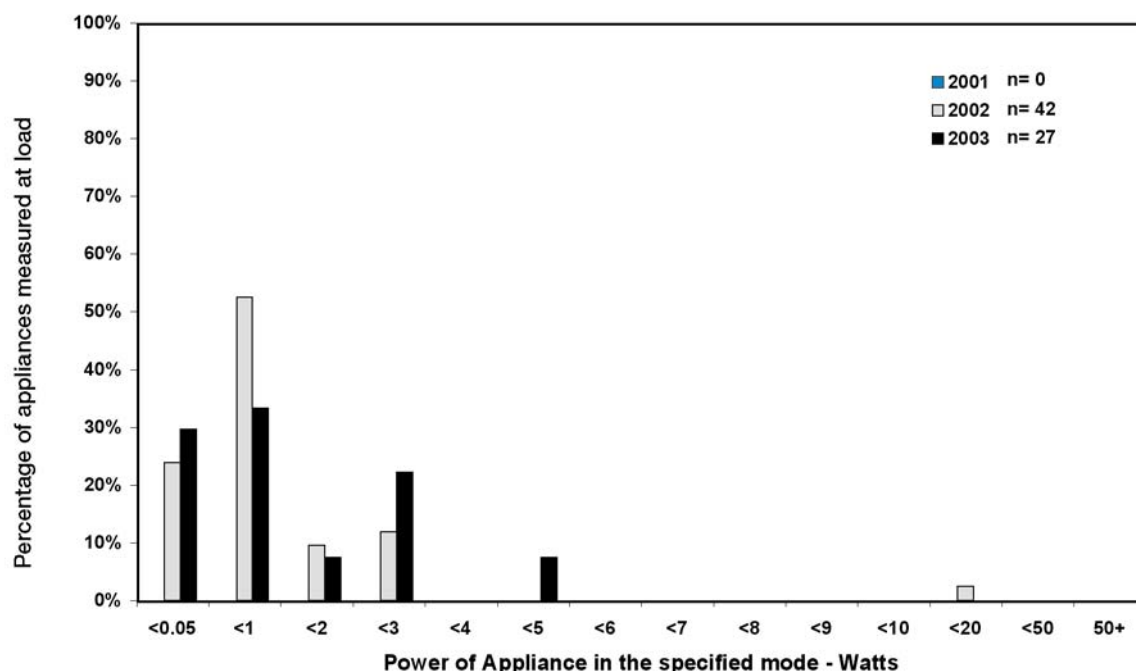
The NAEEEEC commissioned store surveys of products conducted in major retail stores during 2001, 2002 and 2003 collected measurements from 69 dishwashers, although dishwashers were not measured in the 2001 store survey. All of the dishwashers were measured in off mode only.

The 2002 store survey found that one dishwasher measured at least 11W in off while in 2003, two units measured around 4W in off mode. The average off

consumption in 2002 was 0.8W while in 2003 the average was 1W. Figure 1 shows that while the majority of models tested measured less than 1W in off (76% in 2002 and 63% in 2003), there were still many that consumed more than one Watt.

The power consumption of dishwashers in end of program mode was not measured in the store surveys, due to the difficulty of testing this mode while the machine is on display.

FIGURE 1: DISTRIBUTION OF OFF POWER CONSUMPTION – DISHWASHERS 2001, 2002 & 2003



KNOWN STANDBY DATA FOR INSTALLED STOCK

The 2000 NAEEEEC commissioned household survey did not measure dishwashers and as such we are unable to draw conclusions about the off or standby consumption of dishwashers installed in households. However, the survey did record the age of dishwashers present and the average age was found to be 11 years. Just over

half of the 38 dishwashers observed were 10 years or older with at least 3 dishwashers that were more than 20 years old. We can infer from these results that dishwashers have a considerable life time in the Australian market.

GREENHOUSE EMISSIONS

The GHG emissions reduction potential for the proposed standby target of 1 Watt for end of program and 0.3W for off is in the order of 16 kt CO₂-e pa by 2012 and 27 kt CO₂-e pa by 2020.

There is insufficient data on consumption of dishwashers in end of program mode therefore to examine the Business as Usual scenario an estimate was made. The lower boundary for this estimate was based on the power consumption while off, where the average from the most recent store survey was 1 Watt. The upper boundary chosen for this estimate was based on the target of 5W used by the German "Blue Angel" label. However, as the majority of dishwashers sold in Australia power down to off at the end of the

program, the mid point value of 3W was used for this analysis.

To examine the potential for greenhouse savings, one scenario was modelled based on a standby power target of 1W for end of program mode applying to 80% of the market in 2005 and 0.3 W for off mode applying to 80% of the market in 2005. Figure 2 shows the potential GHG emissions reduction. The projected sales of dishwashers are expected to continue to rise at about 2% pa.

The projected effect on total energy consumption used annually by these dishwashers based on the implementation of these targets in Australia is shown in Figure 3.

FIGURE 2: BAU VS POLICY TARGET GHG EMISSIONS FOR DISHWASHERS

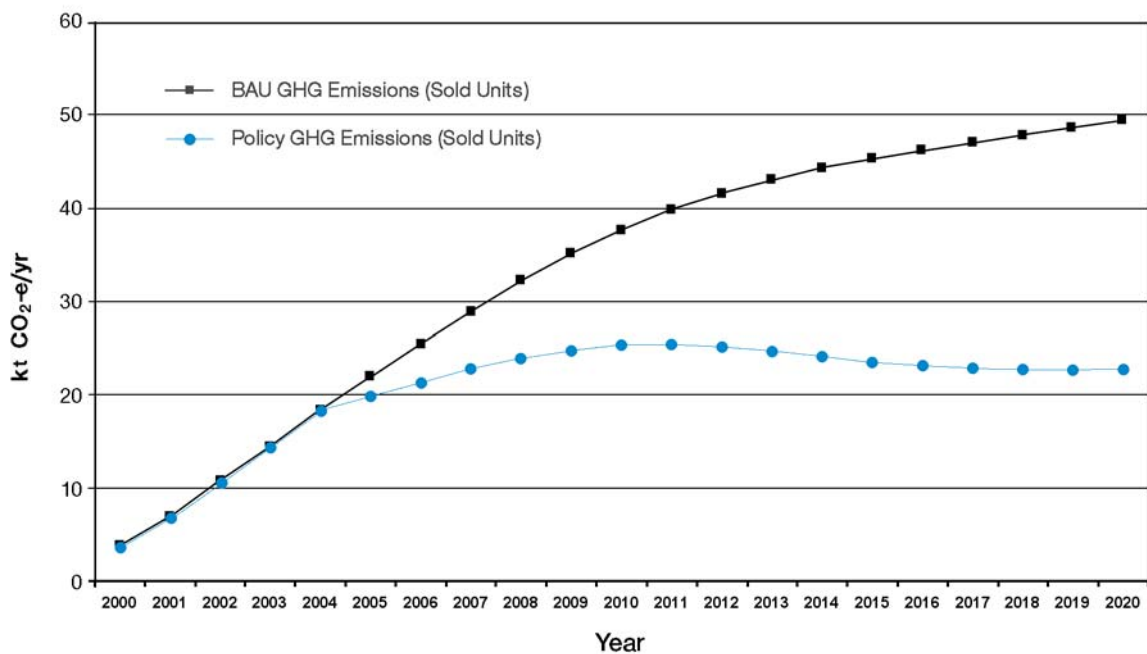
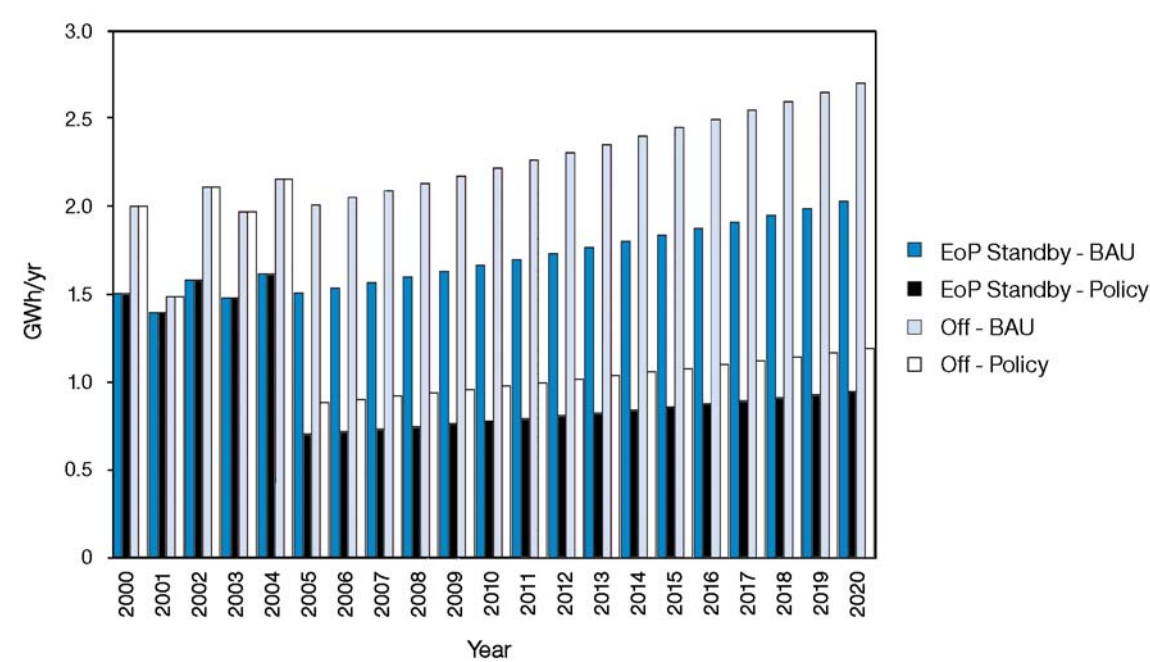


FIGURE 3: BAU VS POLICY TARGETS FOR ENERGY CONSUMPTION OF ALL DISHWASHERS SOLD



CURRENT OVERSEAS POLICIES AND TRENDS

There are many programs and policies that are run internationally that address energy consumption in dishwashers. In some countries such as the USA and Canada, dishwashers are subject to Minimum Energy Performance Standards (MEPS) although there are still programs in these countries that aim to improve on MEPS levels. An overview of the policy measures used internationally is presented below.

NORTH AMERICA

In the US, dishwashers are subject to MEPS. Consumers are able to compare the relative efficiency of different models by looking at the Energy Factor. The Energy Factor is a number computed for each dishwasher model and is calculated by dividing estimated loads per year (264) by the annual energy usage (kWh/year). The US Department of Energy which develops the testing procedures for dishwashers, is now focusing on developing a new test procedure for soil-sensing models.

In the US the ENERGY STAR Program run by the US Environmental Protection Agency (US EPA) aims to encourage industry best practice by forming partnerships with manufacturers and setting performance targets for appliances. The ENERGY STAR program is a voluntary program and specifies that a dishwasher must be 25% above the federal standard. To display the ENERGY STAR label, standard dishwashers must therefore have an Energy Factor of 0.58 or greater. This specification came into effect on January 1, 2001. More details can be found on www.energystar.gov.

In Canada, dishwashers are subject to MEPS. All regulated energy-using products imported into Canada or shipped between provinces must carry an energy efficiency verification mark from a certification organisation accredited by the Standards Council of Canada and Natural Resources Canada. The mark, which must be placed on the outside of the product, indicates that the energy performance of the product has been verified. In line with Canada's free trade arrangement with the USA, MEPS for dishwashers are being revised to mimic those set by the USA.

In Canada, the EnerGuide label for major household appliances and HVAC products is a comparative labelling scheme to enable consumers to compare the energy efficiency of each model to others of the same size and class. An annual appliance directory (paper) is published as a guide for purchasers, listing all

available models on the market. The Energy Efficiency Regulations specify all details pertaining to the labels including placement on products. The program has strong support through internet sites and retailer liaison and training programs. For more information see <http://oee.nrcan.gc.ca/energuide/>.

EUROPE

The EU has a mandatory energy label for dishwashers that also covers other appliances such as whitegoods, air conditioners and electric ovens. The label displays the energy consumption and also rates the appliance as to its comparative level of efficiency. Several European countries outside the EU have also adopted this label.

In Europe, an EU Eco-label award scheme has been in operation since 1993, when the first product groups were established. In 2000, the scheme was comprehensively revised. In all product groups, the relevant ecological issues and the corresponding criteria have been identified on the basis of comprehensive studies of the environmental aspects related to the entire life cycle of these products. An individual product must comply with all criteria (key, best practice and performance) in order to be awarded the EU Eco-label.

The EU Eco-label is a voluntary program administered by the European Eco-labelling Board (EUEB) and receives the support of the European Commission, all Member States of the European Union and the European Economic Area (EEA). Manufacturers apply to have their products labelled with the Eco-label and each application assessed before the Eco-label can be awarded. A dishwasher displaying the Eco-label will consume approximately 40% less energy than non labelled products, consume less water, offer energy saving washing cycles and be easily dismantled and recycled. See <http://europa.eu.int/comm/environment/ecolabel/description/description.htm> for more information on the Eco-label.

While there are many other voluntary endorsement labels from individual countries in the EU, the German "Blue Angel" endorsement label is of particular interest because it addresses the standby consumption of dishwashers as well as the overall energy usage, water consumption and product design (to ensure that the product is recyclable at the end of its life). Standby consumption should not exceed 5W or 1W in "off". See www.blauer-engel.de/englisch/

[vergabe/vergabegrundlagen_download/download_ral.php?id=29](#) for more information on the Blue Angel label in relation to dishwashers.

INTERNATIONAL INITIATIVES

The International Energy Agency (IEA) has been promoting the “One Watt Initiative” energy saving program to cut world-wide electricity losses from appliances in standby. Launched in 1999, this campaign aims to guide government policy-makers and appliance manufacturers towards equipment that consumes no more than 1 Watt when in standby mode. The Australian Government has endorsed the ‘One-Watt’ standby target for appliances sold in Australia. More details can be found in Ministerial Council on Energy standby strategy “Money isn’t all you’re saving” (MCE 2002).

SUMMARY

Table 3 below provides a summary of the policy measures used internationally in relation to dishwasher energy consumption. It should be noted that with the exception of the German “Blue Angel” voluntary program, none of the measures below address standby power consumption specifically, but rather, overall energy efficiency is addressed by these mandatory and voluntary policy measures.

TABLE 3: SUMMARY OF REGULATORY AND VOLUNTARY POLICY MEASURES FOR DISHWASHERS

Country/Region	MEPS	Energy Efficiency Label	Voluntary Programs (Name)
USA	✓	✓	ENERGY STAR
Canada	✓	✓	
Europe (EU)		✓	EU Eco-label
Germany		✓	Blue Angel
Australia		✓	

GOVERNMENT TARGET

In accordance with the National Standby Strategy, NAEEEC intends to recommend to the Ministerial Council on Energy an 'interim' target. The purpose of which is to provide governments with confidence that Australian products will meet the ultimate target, of one watt in 2012. If the 'interim' target is not met in the specified year, government will commence dialogue with industry to explore other options, including the possibility of moving to Stage 2 mandatory measures.

1. INTERIM TARGET - 2007

Product	Off mode power ¹⁾	End of program mode ²⁾
Dishwasher	Less than 1Watt	Less than 4 Watts

Notes:

1. Lowest power when connected to the mains. Limit is applicable to models which have an off mode.
2. Power consumed when the dishwasher has ended the program or cycle, where the unit does not revert to off mode after a fixed period.

This target applies to all dishwashers brought into Australia for sale in that year. NAEEEC proposes to monitor the sale of dishwashers in that year and to move toward regulation should that target not be met by a significant number of suppliers of products.

2. NATIONAL STANDBY STRATEGY TARGET – 2012

Product	Off mode power ¹⁾	End of program mode ²⁾
Dishwasher	Less than 0.3 Watt	Less than 1 Watt

Notes:

1. Lowest power when connected to the mains. Limit is applicable to models which have an off mode.
2. Power consumed when the dishwasher has ended the program or cycle, where the unit does not revert to off mode after a fixed period.

The National Standby Strategy sets out the target of one watt, to be achieved by 2012. This is consistent with international activities, in particular, the IEA "One Watt Initiative". This target should apply to all dishwashers.

The above requirements will be inserted into the relevant Australian Standard.

GOVERNMENT PROPOSALS TO ACHIEVE THIS TARGET

Government agencies intend to take the following actions to assist industry meet the standby targets for dishwashers:

Voluntary Tool Available	Use for this Product	Rationale	Date
Government procurement list	✓	<ul style="list-style-type: none"> MCE will consider creating Government Policy of purchasing low standby dishwashers where available and fit for purpose. This policy will encourage manufacturers to supply government agencies with dishwashers that are energy efficient. 	4th Q - 2003
Industry Code of Conduct	✗	<ul style="list-style-type: none"> Not considered appropriate at this stage 	NA
Australian Standard	✓	<ul style="list-style-type: none"> To communicate government expectations in a new Australian Standard, likely to be a part of AS/NZS 62301 	Initiate 3rd Q - 2003
Annual in-store survey	✓	<ul style="list-style-type: none"> To collect data on all modes for new dishwashers and to analyse trends 	ongoing
Publish Statistics	✓	<ul style="list-style-type: none"> NAEEEC will highlight the range of performances of dishwashers in the marketplace through publishing data on a website or other means. 	Ongoing
Energy Rating label	✓	<ul style="list-style-type: none"> Over the past three years NAEEEC has reiterated its intention to progressively include standby energy consumption into the Comparative Energy Consumption for labelled products such as dishwashers, clothes washers and clothes dryers. NAEEEC will be working with the Standards Committees to finalise the details of modes and test methods for incorporation into Part 2 of the relevant standards. 	Ongoing

Government will announce whether this product should be targeted for stage two intervention under the National Standby Power Strategy (involving possible regulatory intervention) or whether the abovementioned actions together with industry intervention have been successful in meeting the target at the NAEEEC Forum in the year:

2008

REFERENCES

- EES et al 2003, *Appliance Standby Energy Consumption: Store Report 2003*, report for the National Appliance and Equipment Energy Efficiency Committee prepared by Energy Efficient Strategies & EnergyConsult, March 2003, Canberra. NAEEEEC Report 2003/04. www.energyrating.gov.au
- EES et al 2002, *Appliance Standby Energy Consumption: Store Report 2002*, report for the National Appliance and Equipment Energy Efficiency Committee prepared by Energy Efficient Strategies & EnergyConsult, June 2002, Canberra. NAEEEEC Report 2002/08. www.energyrating.gov.au
- Harrington & Kleverlaan 2001, *Quantification Of Residential Standby Power Consumption In Australia: Results Of Recent Survey Work*, report for the National Appliance and Equipment Energy Efficiency Committee prepared by Lloyd Harrington (EES) and Paula Kleverlaan (EnergyConsult), Canberra. www.energyrating.gov.au
- MCE 2002, *Australia's Standby Power Strategy 2002-2012 - "Money Isn't All Your Saving"*. Final report of long-term strategy to achieve Australia's One-Watt Goal 2002 to 2012, Ministerial Council on Energy. NAEEEEC Report 2002/12. www.energyrating.gov.au
- BIS Shrapnel 2002, *The Household Appliances Market in Australia, 2002-2004 Vol 1(i): Whitegoods - Consumer Survey*.
- Energy Efficient Strategies and EnergyConsult *Greening Whitegoods - Appliance Efficiency Trends in Australia 1993-2001*, February 2003.
- Australian Bureau of Statistics Publication 4602.0 *Environmental Issues: People's views and practices*. March 2002

The National Appliance and Equipment Energy Efficiency Committee seeks comment on this proposal from any interested person or organisation.

Please email comments to:

energy.efficiency@greenhouse.gov.au

Alternatively, hard copy comments can be mailed to:

Dishwashers Product Profile
Equipment, Appliances & Transport Team
Built Environment & Communities Branch
Australian Greenhouse Office
GPO Box 621
CANBERRA ACT 2601

Comments received by 30 December 2003 will assist in determining the final form of the policy proposals taken to government regarding dishwashers.

An electronic version of this Standby Product Profile and other Profiles released for public discussion can be obtained from www.energyrating.gov.au under standby.